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X-Ray Treatment of Laryngeal Tuberculosis.—The method described employs a rather complex radiation, with mediocre penetration and long intervals of four to six weeks between sittings. The results reported, however, include almost constant analgesia, and in some cases complete cicatrization of grave laryngeal ulcers in subjects of all ages. At the same time the evolution of the accompanying pulmonary tuberculosis was not modified. A few initial transitory aggravations were observed.—*Debicki, II^e Congr. Méd. Franco-Polonais, Paris, April 20 to 25, 1925, reported in Presse Méd., July 11, 1925, no. 55, 935.—(A. P.)*

Focal Reaction in Lung Following X-Ray Treatment of Laryngeal Tuberculosis.—In a case of laryngeal tuberculosis, complicating disease of both lungs, and treated with a single X-ray exposure cautiously administered, there resulted a focal reaction in the left lung, which resolved very slowly after a febrile reaction of 14 days.—*Herdreaktion der Lunge nach einer Röntgenbestrahlung des Kehlkopfes, H. Deist, Beitr. z. Klin. d. Tuberk., 1925, lxii, 497.—(H. J. C.)*

Radium Treatment of Tuberculous Adenitis.—Tuberculous lymph nodes respond very satisfactorily to irradiation with radium plates. From a study of the notes of 50 consecutive cases of various types certain facts emerge. The best effects were obtained when treatment was carried out in a long exposure with heavily screened apparatus, given during a forty-eight hour stay as an in-patient, although good results were obtained when the patient was treated as an out-patient, with three or four daily sittings of 6 hours each, making a total of 18 to 24 hours' exposure. Patients who had received previous X-ray treatment did not respond to radium so quickly as those who had not. The various reasons for excluding surgical means were as follows: *1:* General physical condition of the patient. *2:* Recurrence after previous operation. *3:* Objection on the part of the patient or parents. *4:* Preference for radium treatment, owing to good results having been

obtained in previous cases. *5:* Operation is now but seldom indicated. The technique is simple. The lymph nodes are marked out with a skin pencil. Over these localities "half-strength" plates, that is, plates covered by 2.5 mgm. radium element to each 1 sq. cm. surface, and covered by a sheet of monel metal 0.3 mm. in thickness and screened with silver 1 mm. in thickness, are applied and held in place by adhesive plaster. Over these a few turns of crepe bandage are placed. The following results were obtained in fifty cases: cured, 37; improved, 9; not improved, 3; dead, 1. Of the cases which did not improve one developed an abscess. Another died of phthisis three years after treatment. Mottram describes the action of radium on tuberculous lymph nodes. There is an early disappearance of the lymphocytes. The lymphoid myeloblasts do not perish. The lymphoid follicles atrophy, and there is a great increase of fibrous tissue. Giant cells persists, and tubercle bacilli have been found persisting many months after radiation. The good clinical results are due to the creation of a site unfavorable to the growth of the tubercle bacillus, rather than to any direct action of the radiation on the bacillus.—*Tuberculous Adenitis Treated by Radium, P. Gosse, Lancet, April 24, 1926, ccx, 862.—(F. M.)*

Methods of Use of Sanocrysin.—Sanocrysin acts primarily as a bactericidal agent of considerable activity, and secondarily through the liberation of bacterial body substances, which, in their turn, act as congestive agents, like tuberculin. Its immediate danger, if employed in excessive doses or in cases with an excessive amount of tuberculosis, is, therefore, likely to be greater than that of tuberculin, which has no direct destructive action on bacilli. The general lines on which selection has been made have been based on two assumptions: *1:* That sanocrysin brings about some degree of destruction of tubercle bacilli, in such foci as can be reached by an agent circulating in the blood-stream; and that, in doing so, it liberates a certain amount of toxic substance. *2:* That sanocrysin itself can act as a metallic poison by virtue of its gold content, and that it has a tendency to cumulative effects if given in too large doses or at too frequent intervals, or to persons unable to eliminate it with sufficient rapidity. In a given case the factors to be determined are (1) the extent and accessibility of the disease foci, (2) the degree of resistance possessed by the patient, and (3) the state of efficiency of the eliminative mechanisms of the patient's body. These factors are interdependent. More important than the extent of the disease in terms of lobes are the density of infiltration in affected parts of the lungs and the presence or absence of extensive fibrosis. Speaking in general terms, the advanced and toxic type of phthisical patient is unsuitable, while the relatively recent case, still well-nourished and with some degree of control of his temperature, is likely to do well. Renal, cardiac or hepatic complications should, in the present state of our knowledge, be regarded as contraindications. In resistant and apyrexial cases with a good toleration of sanocrysin, a good scheme for an initial course of injections is as follows: 0.25 gm., 0.5 gm., 0.75 gm., 1 gm., 1 gm., 1 gm., 1 gm., the doses being separated by intervals of about seven days. To administer the drug intravenously a 10 cc. all-glass syringe is used. The top of the sanocrysin vial is filed off, the top passed through a flame, the approximate amount of sterile freshly distilled water taken up into a sterile syringe and injected into the open vial, the gold salt being brought into solution by drawing the fluid in and out of the syringe a few times. A special needle is kept for this purpose, as it is found that the sanocrysin solution tends to cause slight corrosion of the inside of the needle. The requisite volume of the solution having been drawn into the barrel of the syringe, the "corroded needle" is removed and a fresh needle fitted, into which a drop of sterile citrated salt solution is drawn to prevent clotting and to interpose a non-irritant fluid at the moment of piercing the skin and vein. The solution is slowly injected into the veins of the arm. It is often surprising to see what a few weeks of treatment will do in patients whose condition had offered but little hope of improvement on ordinary treatment. Favorable response to treatment is indicated by diminution in the total amount of sputum and reduction of the number of tubercle bacilli in it. Important danger signals are a marked diminution in the daily excretion of urine, and the appearance of little aphthous ulcers on the tongue or upon the buccal mucous membrane. Intestinal disturbances, especially diarrhea, vomiting or distaste for food, should suggest caution. Sanocrysin, carefully used in suitable cases, is capable of leading to the temporary arrest of the disease and to marked improvement in general health. Though it cannot yet be claimed as a cure for pulmonary tuberculosis, it holds out a new hope of raising many cases of the hospital type to the sanatorium level.—*Some Suggestions as to the Methods of Use of Sanocrysin in Pulmonary Tuberculosis, S. L.*

Cummins, Tubercle, July, 1926, vii, 486.—(B. T. McM.)

Treatment of Tuberculosis with Sanocrysin.—Moellgaard has the following three groups of experiments to prove that sanocrysin exerts a direct bactericidal effect on the tubercle bacillus: *1:* Researches into the influence of sanocrysin on the growth of the tubercle bacillus in culture, showing that sanocrysin, in a concentration of 1–100,000 inhibits the growth of bovine bacilli in cultures, without killing all the bacilli; in a concentration of 1–1,000,000 it has some inhibitory effect. *2:* Study of the influence of sanocrysin on the morphology and staining properties of the tubercle bacillus in culture, showing that a 1–10,000 solution of sanocrysin injures the acid-fast properties of the bacillus. *3:* Researches into the ability of sanocrysin to prevent artificially infected guinea pigs from getting generalized tuberculosis, which resulted in 4 of 5 treated guinea pigs escaping generalized tuberculosis, while 5 control guinea pigs contracted generalized tuberculosis. Before considering Moellgaard's later experiments on tuberculous animals it must be understood that Moellgaard was convinced that he had in sanocrysin a direct bactericide for the tubercle bacillus. His interpretation of the experiments and the theory of sanocrysin therapy that he has built up were based on that assumption. At the same time he regarded these experiments as the strongest indirect evidence that sanocrysin destroys tubercle bacilli *in vivo*, and liberates their toxins. Moellgaard believes that sanocrysin injected into a tuberculous mammal may cause symptoms in three ways: *1:* Tuberculous toxemia, due to the liberation of endotoxins or destruction of tubercle bacilli, and febrile reactions and loss of weight are ascribed to this cause. *2:* Sanocrysin "shocks" due to the formation of a toxin under the influence of the tuberculin released by the destruction of tubercle bacilli, and to the failing immunity of the animal to this toxin. *3:* Tuberculin reactions, which may take the form of focal reactions in any part of the body which is infected with tuberculosis. In sound animals experiments have shown that sanocrysin in larger doses than 0.01 gm. to each kilogram of body weight tends to produce albuminuria, and, in the case of the guinea pig, tuberculous nephritis. The excretion of sanocrysin, according to Moellgaard, is chiefly by the kidneys. Gold seems to select the spleen by preference. This organ contains four times as much gold in proportion to its weight as the liver or kidney. Clinical trials with sanocrysin were begun in November, 1923, in several Danish hospitals and sanatoria. It early appeared that the drug was useless in so called surgical tuberculosis and dangerous in advanced phthisis. Of 136 cases of pulmonary tuberculosis so treated 21 died as a direct result of the treatment. Faber's main principles of treatment are: *1:* Dosage, 0.5 gm. for the first dose and 1 gm. for subsequent doses, increased gradually. *2:* The intervals between doses: three days between the first and second doses, and five days between the later doses, and if the dose caused a reaction the treatment was to be suspended until all signs of reaction disappeared. *3:* The use of Moellgaard's serum which in itself caused troublesome reactions, was limited to severe cases. (Later the employment of the serum was practically abandoned.) *4:* Extensive cases of febrile phthisis were not to be treated. The preliminary report of the British Medical Research Council covered the immediate results of treatment in about 30 cases, of which 22 had pulmonary tuberculosis. Of these 22, 4 died, 4 became worse, the condition of 5 remained unchanged, and 9 showed improvement. Faber's results were much better. Treatment had been completed in 40 patients and the results were: Clinically cured 8, much improved 17, no change 9, exacerbated 6. Sixteen patients were free from tubercle bacilli at the end of treatment.—*The Treatment of Pulmonary Tuberculosis by Sanocrysin, B. R. Clarke, Tubercle, July, 1926, vii, 473.—(B. T. McM.)*

Sanocrysin Treatment.—In this study sanocrysin did not exert any influence on the evolution of the experimental tuberculosis of guinea pigs and rabbits.. In the clinical investigation 31 patients were submitted to the treatment. Careful clinical, laboratory and X-ray data were collected before, during and after the treatment. Only three patients showed marked improvement. It can be affirmed that if sanocrysin acts favorably on tuberculosis, it does so only in a small number of cases. And the favorable action is not sufficiently frequent, rapid, or complete that it can be differentiated with certainty from that which results from the rest, which is always and necessarily associated with the medication cure. It may be affirmed that the maximum benefit is obtained in exudative cases of recent onset. It may be answered that these types, too frequently not recognized by the practitioner and designated grippe, or pulmonary congestion or pleurisy, are precisely those which respond most quickly if rest is instituted early. The therapeutic study of sanocrysin should not be abandoned. It may perhaps

have definite limited indications. Its use may be perfected. An attentive ear is kept open for suggestions from those who continue to use this therapy.—*Essais de traitment de la tuberculose par l'aurothiosulfate de soude, E. Rist, J. Rolland, E. Couland, F. Hirschberg and F. Triboulet, Rev. d. l. Tuberc., April, 1926, vii, 214.*—(*B. T. McM.*)

Treatment of Pulmonary Tuberculosis with Sanocrysin.—This study is based on the treatment of 14 patients over a period of six months. The usual reactions were noted, such as tachycardia, one or two degrees of fever, diarrhea, fall in blood-pressure, and inversion of the blood picture towards mononucleosis. Later complications were albuminuria, erythema and erythrodermia and jaundice. For the most part, however, the injections were well borne. Expectoration was uninfluenced in 12 of the 14 cases. In only one case did bacilli disappear from the sputum. Hemoptysis occurred in two cases. Night-sweats were uninfluenced or aggravated. In grave forms of the disease there was no immediate change in the local condition. In more localized and predominantly fibrotic forms there were focal reactions, characterized by thoracic pain, increase in râles, and even hemoptysis in two cases. As to the late effects of the treatment in 12 of 14 cases there was no modification of the evolution of the lesion, which remained stationary or progressively got worse. The 2 patients who responded favorably had fibrotic lesions. One had a large cavity; the other had a roentgenographic annular shadow which may or may not have been cavity. *Conclusions:* Even though the number of cases treated is small, in presence of the accidents and reactions observed and because of the paucity of definite results obtained, it seems fair to conclude that sanocrysin therapy is not what was claimed for it, and its use should not be continued with the present technique and dosage. In the acute bronchopneumonic forms and for the most part in common phthisis no results were obtained. On the contrary, the therapy is not inoffensive and in certain cases it may be harmful (shock phenomena, albuminuria, erythema, erythrodermia, jaundice, rapid caseation of latent types). In slowly progressive fibrotic cases, afebrile and with good general condition, the same effects were noticed. However, in view of the undoubted amelioration of physical signs and especially of X-ray findings in two case, it is suggested that, even though the method be abandoned because of its dangers, its experimental study should be continued. If it is again resumed in the human clinic the intravenous route should be avoided, and the precise therapeutic dose, the times for administering these doses, and the specific forms of tuberculosis suitable for its employment should be determined.—*Essai de traitement de la tuberculose pulmonaire par le thiosulfate d'or, F. Bezançon, P. Braun and R. Azoulay, Rev. d. l. Tuberc., April, 1926, vii, 237.*—(*B. T. McM.*)

Treatment of Pulmonary Tuberculosis with Sanocrysin.—This study is based on the treatment of 50 cases of advanced pulmonary tuberculosis. The questions to be answered were: Is sanocrysin possessed of a specific action demonstrable by clinical means? What scheme of dosage can be followed to reduce to a minimum the risks and dangers of the treatment? What are the general and special indications and contraindications? To avoid reactions progressively increasing doses were employed, starting at 10 to 15 cgm. The rate of progression of and intervals between doses were determined by the individual tolerance of the patient for the medication. The results obtained are classified into *negative, no result* and *positive.* Negative results mean that the treatment had to be abandoned at least temporarily, and the general or local condition or the combined clinical picture was worse than before the treatment. *No result*—the state of the patient remained the same. *Positive results* are subdivided as follows: *Amelioration*—the attenuation or disappearance of a syndrome or symptom is demonstrable; *marked amelioration*—all the symptomatology, local, functional, toxic and humoral, has undergone a favorable change; *very marked amelioration*—profound modifications of the lesions are demonstrable, with or without disappearance of bacilli, and of other changes in the clinical picture which led to the cure of the patient. There were 3 negative results, 6 no results, and 23 positive, of which 7 were grouped as marked and 16 as very marked. The case histories of these patients are given. In none of the 50 cases was the development of metastatic foci observed. The activity of the tuberculous process appeared to be arrested in the first weeks of treatment in the majority of cases. Sayé believes that the treatment can be tried in all cases of pulmonary tuberculosis after a period of observation, if a tendency to regression or limitation of the lesion is demonstrable. The special indication for sanocrysin is recent exudative lesions. As to dosage, the essential thing is to evaluate exactly the patients resistance, and to adapt the dose under the general principle that the

medication needs a certain time for elimination, and that the reactions which occur are due more to the retention or accumulation of excessive doses of sanocrysin than to a variable concentration of bacillary toxins in the blood. The treatment has been associated with the best results with artificial pneumothorax, in cases in which an uncollapsed cavity due to adhesions at the apex was giving rise to signs of activity. It is indicated in association with other collapse measures, especially in certain cases of giant cavity in which thoracoplasty has not given an absolutely sure result. It is concluded that sanocrysin has a vigorous specific action on pulmonary tuberculosis. The best results are obtained by following a technique of treatment which avoids reactions.—*Résults obtenus dans le traitement de la tuberculose pleuro-pulmonaire de l'adulte par la sanocrysin, L. Sayé, Rev. d. l. Tuberc., April, 1926, vii, 255.*—(*B. T. McM.*)

Treatment of Pulmonary Tuberculosis with Sanocrysin.—This study was made on 13 patients who volunteered or asked for sanocrysin treatment. In all instances there was a preliminary period of observation for about fifteen days. During this time and throughout the course of treatment very careful clinical and laboratory examinations were made, particularly as to the weight and amount of sputum, and the diminution in numbers of bacilli in, or their disappearance from, the sputum. X-ray films were taken every three weeks or every month. To eliminate errors of technique two pictures were taken simultaneously. Intravenous injections were given every eight days, in progressive doses starting with 0.25 gm. and increasing to 0.5 gm., 0.75 gm., and 1 gm., which latter dose was repeated three to six times but never exceeded. The total dose injected varied from 2.25 gm. to 10.25 gm. The drug was administered in isotonic solution (obtained by adding 5 cc. to 0.25 gm. and 20 cc. to 1 gm.) after meals. The antitoxic serum was never used. As far as possible the cases chosen were young people with uncomplicated pulmonary tuberculosis. All had tubercle bacilli in the sputum, and in the group were included acute exudative types, cavity types and fibrotic cases. Of the patients treated, none had been submitted to artificial-pneumothorax therapy because in all cases the lesion was bilateral. The results obtained in 13 cases treated are as follows: In one case treatment had to be abandoned at the onset because of complications. Four are dead. Among the other 8 cases, one is stationary and 3 are somewhat worse; in the last 4 an improvement is evident, general symptoms have to a slight extent cleared up, and the serial X-ray films show a certain degree of clearing. Such is the position after three months of treatment. In 2 of the 4 patients who died it was evident that each treatment was badly borne. It did not check the clinical course, but it is not warranted to say it aggravated it. In the other 2 cases the aggravation followed too strongly and too rapidly after the start of the treatment to exclude the latter as the cause. There is evidence to support the view that sanocrysin, outside of the immediate inconveniences of each injection, is decidedly dangerous, and can hasten a fatal issue. In the group of 4 cases which showed progression of the pulmonary lesions the treatment had to be discontinued in one patient after a total dose of 6.5 gm., because it was so badly borne and the reactions were so severe. Among the three others, while there was definite symptomatic improvement, X-ray and physical examinations showed extension of the disease. The degree of improvement in the group of 4 cases which responded favorably was not in excess of what might be expected from rest and hygienic measures. From this study it is not possible to conclude that sanocrysin has a bactericidal action. Its curative value is not admitted, since it did not bring about a cure in those types of tuberculosis commonly considered incurable.—*Le traitement de la tuberculose pulmonaire par la sanocrysin, E. Sergent, F. Bordet, H. Durand and R. Kourilsky, Rev. d. l. Tuberc., April, 1926, vii, 196.*—(*B. T. McM.*)

Treatment of Pulmonary Tuberculosis with Sanocrysin.—Impressions from observing the use of sanocrysin in human tuberculosis are noted. Eleven cases were chosen, and of these 4 were discarded early as not suitable. Two patients died, one from meningitis and one from caseous pneumonia; consequently, they may be considered as desperate cases. The dosages were large at the outset, 0.5 to 1 gm., but were more moderate later. In most instances severe reactions resulted, which were characterized by fever, rash, and anorexia, and were accompanied by albuminuria as described by the original Danish workers. The action of sanocrysin is referred to as specific in tuberculosis, so much so that when a reaction was obtained in a case of questionable diagnosis it was brought forward as good evidence that the case was tuberculous. Four cases are reported as materially improved, and it is concluded that Faber is justified in his observation that sanocrysin can produce more rapid improve-

ment in tuberculosis than can be obtained by any other form of treatment known.—*The Treatment of Pulmonary Tuberculosis with Sanocrysin, T. R. Elliott, Lancet, January 16, 1926, ccx, 126.—B. H. D.)*

Results of Sanocrysin Treatment.—The patients selected for treatment were of the fibrotic or fibrocaseous type, slowly progressive, and with frequent relapses and periods of improvement. In the first 5 cases in the series artificial pneumothorax had been induced with very good initial results. In each, however, there had been a relapse with return of bacillary sputum. After a short period of treatment with sanocrysin one patient was slightly worse. The other four improved, two of them becoming sputum-negative. The next 8 cases were of the fibrocaseous type. All had positive sputum. After sanocrysin the number of bacilli in the sputum was reduced in every case, and in four they disappeared altogether, though they reappeared in two of these. A case of spontaneous pneumothorax was given the sanocrysin treatment in an attempt to improve the condition of the other lung. The patient, however, became worse. In the other 5 cases there was bilateral disease, the worst lung was treated by artificial pneumothorax, and sanocrysin was also given in the hope that it would have a good effect on the disease in the other lung. Four became sputum negative (though in one bacilli reappeared) and in the other the bacilli were much reduced in number. The sanocrysin was given intravenously, and the initial dose was 0.25 gm. This was followed a few days or a week later by 0.5 gm., then 0.75 gm., and finally 1 gm. This was the maximum dose given, and was repeated weekly. It was noticed that in many cases no reaction occurred until a dose of 0.75 or 1 gm. was reached, and that this reaction became less marked on subsequent injections. In 2 cases small doses (0.1 gm.) were given daily for a week, and then this course was repeated after a week's interval. This method had no effect in one case, and in the other it produced slight albuminuria, pains in the extremities and disappearance of tubercle bacilli from the sputum. Taking the 20 cases as a whole, two became worse, and 18 improved or remained unchanged. In 10 cases bacilli disappeared from the sputum, although in 3 of these they reappeared.—*Sanocrysin in the Treatment of Pulmonary Tuberculosis. A Report to the Medical Research Council on the Immediate Results of the Treatment in Twenty Cases, L. S. T. Burrell, Tubercle, July, 1926, vii, 479.—(B. T. McM.)*

Action of Sanocrysin on Tubercle Bacilli.—Sanocrysin is only slightly toxic for tubercle bacilli *in vitro*. Its effects on the experimental tuberculosis of laboratory animals are nil. It does not liberate any specific toxin by its contact *in vitro* with tubercle bacilli. Antituberculosis serum, whose employment has been advocated to limit the toxic effects of sanocrysin in tuberculous subjects, does not modify the toxicity of the tuberculin reactions. The results of treatment by sanocrysin over a period of months on 26 patients are given in considerable detail. The majority of the cases were treated by the Danish sanocrysin supplied by Moellgaard. In a small number krysolgan was used. In their effects on the human organism no difference was noted in the two products. The technique followed was that recommended by the Danish authors. The gold salt is dissolved in freshly distilled water and injected very slowly into the vein of the arm. The dose starts with 0.25 gm., and is gradually increased to 1 gm. The interval between doses is determined by the reactions. The dose of 1 gm. is never exceeded, and is only repeated if well tolerated. The maximum total dose is 10 to 12 gm. The antituberculosis serum was never employed, because the authors doubted its beneficial action and did not wish to add a serum intoxication to the metallic intoxication of the drug. As a general rule, the patients were observed for a time before starting the treatment. It is important to adhere to this procedure, in order to avoid attributing to the medication spontaneous amelioration and to be able the better to judge the natural course of these cases before institution. A period of 15 days is adequate. During this time very careful records were made of the history, the time of onset, the symptoms at onset and their subsequent evolution; general symptoms, especially the amount of sputum and its richness in tubercle bacilli, and complete physical and X-ray examinations. To avoid errors of interpretation and those due to faulty films two X-ray pictures were made at the same time. In addition to these investigations a Wassermann and tuberculosis complement-fixation reaction were added; also the red-cell sedimentation test, and finally the skin reaction and complete examination of urine, especially the repeated search for albumin. The results of treatment were classified as follows: *1: Favorable:* When the good results seemed to be due with quasicertitude to the intervention of the medication. Of the group of 26 patients 9 came under this heading, 6 men and 3 women. *2: Disputable:* When the favorable outcome could not with

certainty be attributed to the drug. There were 8 such, and all were men. *3: Negative:* When the active course of the disease progressed as if there were no intervention. There were 7 cases, 4 men and 3 women. *4: Bad:* Two patients (men) concerning whom the impression was that the drug had exerted an unfavorable reaction, fatal without doubt in one of the cases. The group of 9 favorable cases were patients with bilateral fibrocaseous lesions of recent (weeks or months) onset. The disease was active and progressive, with temperature varying between 38.5° and 39.5° C. Very quickly, between the fifth and seventh injections, improvement was noticed. Besides the restoration of the feeling of well-being and general symptomatic amelioration, the temperature curve became regular and gradually fell by lysis. A few days after the cessation of treatment the temperature sometimes shot up, but for the most part the patients remained afebrile. This phenomenon was so constant that the persistence of fever after the eighth injection indicated a failure to respond to the treatment. Coincident with the excellent symptomatic improvement cough and sputum diminished or almost disappeared. Inconstantly the number of tubercle bacilli diminished, but they did not entirely disappear as claimed by the Danish authors. Adventitious signs in the chest gradually diminished or disappeared, and there was corresponding change in the X-ray findings. Similar physical and roentgenological mutations are well known to occur as a result of prolonged sanatorium treatment, but in this group of cases the results followed the therapeutic intervention rapidly. In 2 cases there was marked symptomatic improvement, but the physical signs remained substantially unaltered. In an appreciable number of cases the cutaneous reaction, which had been positive, became negative. In a number of cases, whose condition was improving under sanocrysin treatment, the red-cell sedimentation rate was lowered. There was no alteration in the complement-fixation reaction. Immediate and late reactions resulting from the treatment were met with. These varied much in type, gravity and frequency. Sometimes there was no reaction. In a good number of cases, perhaps more frequently in women, there becomes manifest rapidly after the injection, in the following half hour, the following phenomena: suffusion of the face, with brilliant and injected eyes, a metallic taste in the mouth, and nausea which is followed by vomiting. These reactions may be repeated a number of times. Then diarrhea, lasting a few hours to a day, sets in. During this time the temperature rises sharply and may be preceeded by a chill. Following subsequent injections reactions may occur, but they are usually less severe and the temperature is lower. In 2 cases shock phenomena were observed, but these were never alarming. Adrenalin was used to combat reactions instead of the reputed specific antituberculous serum. These reactions were never sufficiently severe to cause discontinuance of the treatment. They occur less frequently if the doses are spaced at weekly intervals. *Conclusions:* The pathological interpretation of the symptoms which is proposed is borne out by clinical investigation, and possesses a really important bearing on the technique of the treatment. It implies, in effect, that the drug is not harmless but can be favorably regulated by a dosage founded on pharmacological and toxicological study more precisely than on the biological interpretation of the effects of the medicament, as formulated by the Danes. Indeed, sanocrysin intoxication exists. Great stress must be laid on the dosage and on the intervals between injections, but the alarm aroused by this treatment at first does not seem justified. As to its therapeutic value, it is not at present possible to draw conclusions. Only two conclusions are warranted: first, it has not been sufficiently constant in its beneficial effects to be considered a specific; second in a certain number of cases it is permissible to attribute to the product an action on tuberculous pulmonary lesions. This action is at the time evidenced by changes in physical signs and by arrest of the progress of the disease in so many cases that further study is encouraged. There is evidence to support the impression that the most amenable types are the caseous ulcerative, more or less infiltrative pulmonary lesions with acute or subacute course, of recent onset and of grave prognosis; the best results were seen among such cases. On the contrary, the slowly progressive chronic fibrotic lesions are not much if any affected by the medication. The chronic exudative types supervening upon advanced phthisis, occasionally seemed somewhat improved, but real results are not to be hoped for in such.—*Quelques expériences relatives à la action de la sanocrysine sur le bacille tuberculeux et sur la tuberculose expérimentale des rongeurs, A. Calmette, A. Boquet, and L. Nègre, Rev. d. l. Tuberc., April, 1926, vii.—(B. T. McM.)*

Sanocrysin and Tuberculin Reactions Compared.—This study consists of three groups of experiments. The first was planned to determine the toxic dose of sanorcrysin on healthy and tuberculous

guinea pigs. The second was to show whether there is an identity of action from sanocrysin and tuberculin in tuberculous animals. The third was to demonstrate the action of hyposulphite of soda on the healthy and on the tuberculous guinea pig. *Conclusions: 1:* Sanocrysin is little more toxic for the tuberculous than for the healthy guinea pig. *2:* Sanocrysin habitually provokes in the healthy animal signs of intense congestion of part of the lymph nodes and of the viscera, demonstrable at autopsy. Similar changes are observed in the tuberculous animal, but with smaller doses. The signs of congestion in the tuberculous animal, in the case of sanocrysin injection, are not especially confined to the site of the tuberculous lesions, as is the case with tuberculin injections, and this congestive state has always seemed independent of the degree of the tuberculous involvement of the animals. Congestion following a tuberculin reaction is, on the contrary, in direct proportion to the number and extent of the tuberculous lesions. *3:* The local reaction at the site of inoculation of sanocrysin has nothing in common with that of tuberculin since the latter is only produced in tuberculous animals whereas that produced by sanocrysin is equally well marked in healthy and tuberculous animals. *4:* A similar local reaction follows the injection of hyposulphite of soda in doses of 25 cgm. per kilo, so much so that it cannot be determined whether this phenomenon was due to the formation *in situ* of sulphuric acid as reported by Kobert. *5:* A serum charged with tuberculous antibodies is perfectly capable of neutralizing the action of a rapidly fatal dose of sanocrysin, but cannot influence a lethal dose of tuberculin, death occurring in the same time with the treated as with the control animals. Under these circumstances it appears difficult to admit any identity of action between sanocrysin and tuberculin in the tuberculous organism.—*Comparison entre l'action de la sanocrysin et de la tuberculine sur les cobayes sains et tuberculeux, E. Fernbach and G. Rullier, Rev. d. l. Tuberc., April, 1926, vii, 300.*—(*B. T. McM.*)

Sanocrysin Treatment of Experimental Tuberculosis.—Sanocrysin treatment on 20 rabbits, as well as treatment with other gold preparations, had no influence upon tuberculosis in these animals. Moellgaard's culture *V* proved only of slight virulence. Experiments with sanocrysin on 24 calves turned out entirely negatively, even though treatment was begun before infection. Moellgaard's mistakes are attributed to the fact that he used old cultures which produced irregular disease in the animals, while the author used pus from tuberculous foci and fresh bouillon cultures for infection.—*Sanocrysin und experimentelle Tuberkulose, O. Bang, Ztschr. f. Tuberk., 1926, xliv, 298.*—(*H. J. C.*)

Treatment of Laryngeal Tuberculosis with Triphal.—*Triphal* is a gold-product, which has been found to be a very satisfactory agent in psoriasis, and was used on cases of laryngeal tuberculosis selected in such a way that the pulmonary involvement was not progressive and the outlook favorable. A continuous elevation of temperature in a patient, however, was not a contraindication. Numbers of patients were given triphal along with local treatment with the cautery, curettage, roentgen ray or heliotherapy, and but 12 cases remained in which only triphal was used. The drug was administered hypodermically in doses ranging from 0.005 to 0.1 gm. at ten to fourteen-day intervals for a few doses. Most of the patients gave a general reaction, but only one a local reaction after administration of the drug. Three of the cases showed no improvement, 5 showed definite improvement, and the others were so much improved as to be considered nearly healed.—*Erfahrungen mit Triphal bei Kehlkopftuberkulose, G. Finder, Deutsche med. Wchnchr., July 9, 1926, lii, 1164.*—(*H. S. W.*)

Dangers in Triphal Treatment of Tuberculosis.—Triphal, although very useful in the treatment of tuberculosis and various skin diseases, frequently causes severe disturbances in patients. These include vomiting, disseminated pain, cardiac collapse, fall in blood-pressure, numbness in the head, loss of consciousness and transient paralysis.—*Bemerkungen zur Triphalbehandlung, Görl and Voight, München. med. Wchsnchr., August 13, 1926, lxxiii, 1360.*—(*E. R. L.*)

Treatment of Surgical Tuberculosis with Gold.—*Krysolgan* and *Triphal* were used, the largest single injection being 40 cc. Of 26 cases thus treated and still under treatment, there were 6 unimproved, 15 improved and 5 healed. It is believed that after the first or second injection there is a definite improvement. As a closing remark it is stated that the period of observation has been too short and the cases still too few to draw definite conclusions regarding the method.—*Goldbehandlung bei chirurgischer Tuberkulose, Siedamgrotzky, Centrlbl. f. Chir., 1925, lii, 2642.*—(*H. J. C.*)

Treatment of Tuberculous Fistula with Copper Sulphate.—Copper sulphate

in 10 per cent aqueous solution was found valuable in the treatment of tuberculous osteomyelitis with fistula. The amount injected was limited to 2 to 3 cc. at a time, in order to avoid systemic effect. Urine examinations were made frequently during the course of the copper treatment, and no damage of the kidneys due to the treatment could be detected. The skin around the orifice of the fistula was protected by vaseline, and after the injection the opening was closed with a plug of cotton impregnated with vaseline. Results with short fistulas were excellent, and the favorable effect appeared to be the direct result of the strong, bactericidal caustic on the wall of the fistula. The injured tissue sloughed slowly after the caustic action and fresh granulations followed, with subsequent perfect healing. Ordinarily three to four weeks were allowed to elapse before a fistula was injected a second time. Large fistulas were not benefitted by this treatment. Temporary apparent healing resulted from the treatment in some cases, but reopening of the lesion followed. With pyogenic osteomyelitis the results were better than with tuberculous osteomyelitis.—*Zur Fistelbehandlung mit Kupfersulfat, J. Rey, München. med. Wchnschr., June 18, 1926, lxxiii, 1028.*—(*E. R. L.*)

Treatment of Pulmonary Tuberculosis with Treparsol.—*Treparsol*, a formyl-metaäminoparaoxyphenyl-arsentrioxyd, was used in 16 cases of pulmonary tuberculosis, 6 being early, 6 moderately advanced and 4 severe cases. Treatment was given for two to six weeks. Treparsol is not considered a suitable remedy for pulmonary tuberculosis, and is not without harmful consequences. When tuberculosis is complicated with syphilis this reagent may be of some value.—*Erfahrungen mit einem kombinierten Ameisensäurearsenpräparat in der Behandlung der Lungentuberkulose, Sachs, Beitr. z. Klin. d. Tuberk., 1926, lxii, 779.*—(*H. J. C.*)

Treatment of Tuberculous Hemoptysis with Tartar Emetic.—In 11 cases refractory to emetine, tartar emetic was given in doses of 0.03 to 0.05 gm. in pills, together with 0.01 gm. of thebaic extract. The daily dosage was from 0.05 to 0.15 gm. In 5 cases the dose of 0.05 gm., given for the first time, stopped a severe hemoptysis within a few minutes. In another case a second dose was necessary. In 6 other cases doses of 0.03 gm., within an hour, reduced hemorrhages of 80 to 400 cc. to merely a little bloody expectoration, with final cessation. The effects were noticeable a few minutes after the appearance of nausea. Three patients obtained the effects without experiencing nausea. The arterial tension was not generally affected, although the pulse became slightly retarded. It appears that nausea establishes in the cardiopulmonary circulation conditions favorable to hemostasis, probably by means of a vasomotor reflex which directly affects the smooth muscles of the pulmonary arterioles. Tartar emetic, therefore, should have a definite place in the treatment of pulmonary hemorrhages. Bezançon and Mouisset in the discussion of this paper, corroborate the preceding observations. Bezançon regards tartar emetic as having almost a specific effect, but unfortunately certain patients cannot tolerate it. He recommends a combination of morphine and ipecac, as in Dover's powder. Bouin has used morphine and tartar emetic without noticing any striking effects.—*L'emploi du tartre stibié par voie buccale contre les hémoptysies tuberculeuses, Ch. Mattei and F. Escudier, xviii^e Congrès Français de Médecine, July 16–19, 1925, reported in Presse Méd., August 19, 1925, no. 66, 1110.*—(*A. P.*)

Treatment of Pulmonary Tuberculosis with Calcium Inhalations.—A tall jar, with pulverized calcium carbonate and *Dematol* in the bottom, contains a glass tube that is connected with a rubber bulb, and the inner end of the tube is buried by the powder. A rubber tube leads from the bottle near the top to a small nozzle, which is inserted in the patient's mouth. Patients inhale as much as 2.5 to 5.0 gm., or even more in some instances, daily for eight or ten days, and in this way receive a much greater bulk of the drug than is possible by any other means. The patients experience great benefit and the drug facilitates scarring of the diseased areas.—*Zur Behandlung der Lungentuberkulose durch Kalkinhalation, B. Fujimoto, Deutsche med. Wchnschr., December 11, 1925, li, 2072.*—(*H. S. W.*)

Treatment of Tuberculosis with Calcium and Silica.—The value of nonspecific biological stimulating therapy in tuberculosis is becoming more highly appreciated. Excellent results have been secured in the treatment of tuberculosis by the inhalation of calcium-silica mixtures, and Strahlmann reports favorable effects from intramuscular and subcutaneous injections of calcium-silica preparations. With the exception of cases of far-advanced tuberculosis, most cases of pulmonary tuberculosis are suitable for the treatment. Laryngeal tuberculosis, however, does not seem to be favorably influenced, and there is no effect on the course

of miliary tuberculosis or tuberculous meningitis. As a rule, no general reaction occurs. A few patients are hypersensitive to silica. In patients with pulmonary tuberculosis in the second stage, rapid abatement of symptoms and early cure result. The general metabolism improves and the resistance of the body is increased, so that natural healing results.—*Die Kalzium-Siliziumbehandlung der Tuberkulose, die Therapie der Wahl für die ambulante Praxis, Strahlmann, München. med. Wchnschr., December 18, 1925, lxxii, 2189.*—(*E. R. L.*)

Amyl Nitrite in Hemoptysis.—Inhalation of amyl nitrite provokes, within two or three minutes, a vasodilatation and hypotension in the major circulation and a vasoconstriction, followed by anemia, in the lesser circulation, with a coincident rise in the pulmonary arterial pressure. Its hemostatic power is so strong that if, at the time of intravenous injection, section of the lung is made, bleeding is checked as though the vessels were ligated. Amyl nitrite is not intended to stop all forms of pulmonary hemorrhage and not every hemorrhage will respond. Its use has some advantages. Although a very active drug, it is innocuous and can be given repeatedly. It should be avoided in cases of old fibroid phthisis subject to hypertensive hemorrhages. It is eliminated rapidly, and there is no danger of cumulative action. Following its use there is no secondary vasodilatation in the lungs. It acts rapidly and strongly, but its effects are not durable and it is a remedy of urgency. Its preparations are easily administered and may be preserved without fear of deterioration, and the patient may carry some of the amyl nitrite pearls on his person and use them as a temporary measure in case of emergency. This helps to allay the patient's fear. The drug is principally indicated in the congestive hemoptyses.—*Il nitrito di amile nella terapia della emottisi, M. Cayrel, Tubercolosi, February, 1926, xviii, 34.*—(*U. E. Z.*)

Codliver Oil and Fat-Soluble Vitamines.—Although codliver oil has been used therapeutically for centuries, until recently it was an extremely crude product, generally separated by allowing the livers to decompose until oil was released by disintegration from the liver cells and was then skimmed from the surface. Such oil, now known as "rotted oil," or by the trade name of "cod oil," is of a dark color and decidedly nauseating odor and taste, due to the presence of such secondary products as butylamine, amylamine, hexylamine, and dihydrolutidine, produced by decaying cellular matter. The virtue of codliver oil has been ascribed to its phosphorus or iodine content, the presence of unusual fatty acids, liberated during digestion, and to its caloric value. At present, however, the essential fat-soluble vitamines appear to be most important. Also, modern manufacturing processes have replaced the old crude ones, involving the use of steam-kettles, separators, brine-cooled presses, etc., designed especially for the manufacture of medicinal codliver oil. Such a product is of light yellow color, low free fatty acid content, and possesses a wholesome odor and flavor and a high vitamine potency. Investigations have shown that American codliver oil has a higher potency than the Norwegian. This is ascribed to the year-round cod-fishing in this country, whereas in Norway it is largely confined to the spawning season, when the liver's store may be supposed to be depleted. It was early found the codliver oil was the richest natural substance in vitamine A (antiophthalmic) and vitamine D (antirachitic), the presence of vitamine E (fertility vitamine) being still under dispute. For at least two or three hundred years codliver oil has been recognized as of special value in rickets, and this value has been conclusively proved to reside in vitamine D, which is necessary for normal calcium and phosphorus deposition. An early report that ultraviolet emanations had been detected from codliver oil has not been substantiated, and at present the explanation for the similarity in effect to ultraviolet light seems to be a chemical one. Cholesterol, irradiated with ultraviolet light, acquires antirachitic activity, and human fat, including subcutaneous fat, is rich in cholesterol. It has recently been shown that the longer ultraviolet rays will pass through living white human skin if not too thick. Hess has confirmed this by feeding calves skin, both irradiated and not. Also, oils containing cholesterol or phytosterol, but exhibiting no detectable antirachitic value, develop antirachitic potency when irradiated, although inferior to codliver oil. Codliver oil is rich in cholesterol, and if saponified its antirachitic value is found in the unsaponifiable sterol portion. The antirachitic substance, however, is not cholesterol, but a sterol substance associated with it (Zucker). More definite information is at hand regarding the chemical composition of vitamine A, separated by Takahashi from codliver oil, spinach, and other sources. From a highly potent codliver oil he separated constituents representing 0.1 per cent of its volume, purified by distillation under pressure. This he termed *biosterin*, a compound with formula $C_{27}H_{44}O_3$, reacting

with acetic and benzoic aldehydes and phosphorus pentachloride to produce definite color reactions. Its potency was such that 0.001 to 0.005 mgm. daily sufficed to meet the vitamine A requirements of young albino rats and a somewhat larger amount to effect recovery from vitamine-A malnutrition. Injected hypodermatically a 0.125-gm. dose was fatal in two hours, being about 10,000 times the nutritional requirement. Neither sunshine nor ultraviolet light has been shown to have any vitamine-A value, and oils which have acquired antirachitic activity from exposure are not comparable to good codliver oil as a source of vitamin A. Further data will probably soon be accumulated.—*Modern Cod Liver Oil as a Source of Fat Soluble Vitamins, A. D. Holmes, Boston M. & S. J., April 22, 1926, cxciv, 714.*—(*A. P.*)

Prognosis of Pulmonary Tuberculosis.—The unfavorable prognosis of cavities was verified, but to-day the proper use of collapse therapy has made this type more favorable. The life expectancy of phthisical patients was on an average two years, the upper border for chronic consumptives being 7 years. The prognosis of positive-sputum cases is less favorable than those with negative sputums. The author does not concur in the Hollo's double division of pulmonary tuberculosis into "genuine phthisis" and "juvenile tuberculosis." He is convinced that the favorable forms of juvenile tuberculosis do not indicate an initial stage of chronic pulmonary tuberculosis. The juvenile cases develop in those in whom the tuberculous primary complex does not rapidly heal, or, in addition, in such cases of developed "secondary" tuberculosis that persists for a long time, and produce an immunity which protects the body against the occurrence of isolated phthisis.—*Über Prognostik der Lungentuberkulose, A. V. v.Frisch, Beitr. z. Klin. d. Tuberk., 1925, lxii, 629.*—(*H. J. C.*)

Haemogram as Aid in Prognosis of Tuberculosis.—In order to determine the practical value of the haemogram in the biological classification of cases of tuberculosis, 50 sanatorium patients were studied in such a way that the clinical and hematological observations were carried on side by side. The observations were, however, made independently, so that neither side would influence the other. The hematological evaluation was made according to Ockel (*Münch. med. Wchnschr., 1925, and Arch. f. Kinderhk., vol. 24, no. 1*) on the basis of Schilling's (*Deutsch. med. Wchnschr., vol. 24, p. 46*) findings as to the relation of the leucocytes in infectious diseases. A comparison of the clinical and hematological results revealed that the clinical findings, after 14 days of observation, and the hematological findings on the basis of three smears with intermediate cutaneous inoculation, agreed in 32 cases (75 per cent), and disagreed in 6 cases (13 per cent) in which the hematologic examinations were correct, and in 5 cases (12 per cent) in which they were unreliable. In cases in which the clinical observations were carried over four weeks there was agreement in 53 individual examinations (60 per cent), disagreement in favor of the hematological examination in 12 (17 per cent), and disagreement unfavorable to hematological examination in 23 (26 per cent). The haemogram possesses a high value in the biological estimation of pulmonary tuberculosis. It is the most sensitive objective method of determining the influence of the process upon the entire body. It is essential in utilizing the haemogram that the Schilling smear and counting technique be exactly followed, and prolonged experience in the determination of cell forms is necessary. The four-phase scheme of Schilling should be utilized.—*Das Hämogramm als Hilfsmittel bei der Tuberkulose-Begutachtung, Engel and Ockel, Beitr. z. Klin. d. Tuberk., 1925, lxi, 726.*—(*H. J. C.*)

Red-Cell Sedimentation and Urochromogen Reactions in Prognosis.—The sedimentation reaction does not give any definite information regarding prognosis. During hemoptysis there was an increase in the initially low sedimentation figures. The Weiss reaction indicates prognosis better according to the Gerhardt-Turban classification. During hemoptysis the urochromogen increases, and it also increases and decreases according to the severity and activity of the process. In order for the diazo test to become positive urochromogen must be present in large amounts.—*Über den Wert Blutkörperchensenkungsgeschwindigkeit und der Urochromogenreaktion für die Prognose der Lungentuberkulose, S. Hakki, Beitr. z. Klin. d. Tuberk., 1925, lxii, 255.*—(*H. J. C.*)

Protective Inoculation of Children with Dead Tubercle Bacilli.—Sixty-one infants were inoculated with an emulsion of dead tubercle bacilli,—"Langer's inoculation material 147,"—and were under observation for several months thereafter. Two of the children were quite ill after the inoculation. All the others remained perfectly well. Prior to the injections they were tested *à la Pirquet* with old tuberculin, 1:100, and

with Löwenstein's *Dermatubin;* many also received 10 mgm. old tuberculin subcutaneously. At two to three months after inoculation, 38 of these infants were sensitive to tuberculin, and so far as could be determined the sensitiveness differed in no way from that in children who had acquired tuberculous infection spontaneously. The tested children were not sensitive to protein (egg-white). Focal reactions could be elicited by subcutaneous injections of tuberculin. There appeared to be no material difference in the length of the preallergic period in infants inoculated when less than one month old and in children several months old. Intracutaneous reinoculation with this emulsion was followed by Koch's phenomenon and early disappearance of the second area of infection. The inoculations were made in various situations and in differing doses.—*Tuberkulinempfindlichkeit bei Kindern nach Vakzinierung mit Langerscham Impfsloff 147, G. Fedders, Deutsche med. Wchnschr., October 2, 1925, li, 1659.—(H. S. W.)*

Protective Inoculation of Dead Tubercle Bacilli.—It has now been convincingly shown that children who are nonsensitive to tuberculin will develop hypersensitiveness after they have been inoculated with killed tubercle bacilli. It is to be supposed that the relations that exist normally between allergy and immunity would exist in these conditions, and that the allergy which develops after injection of killed tubercle bacilli will be associated with immunity to tuberculosis. The absolute proof of the protection clinically must be gained by practising the injections on infants that will inevitably be compelled to live in dangerous tuberculous surroundings. Although in guinea pigs, the establishement of an absolute immunity is not possible, the severity and duration of the disease can be modified by agents that are protective, especially if careful attention is given to dosage. The protective influence of dead tubercle bacilli was tried on animals in the following way: Fourteen guinea pigs, which had three months previously received an injection of killed tubercle bacilli, were inoculated intracutaneously, each with 0.0001 mgm. of living bacilli, along with 10 normal animals, and were all kept until death. The average duration of life of the normal controls was 3½ months and that of the "protected" animals was 6½ months, while at 9½ months after infection 3 of the latter group were still alive. This result lays the foundation for the practical application of the principle of inoculating dead tubercle bacilli in order to protect against infection with virulent tubercle bacilli.—*Weitere Mitteilungen zur Tuberkuloseschutzimpfung mit abgetöteten Tuberkelbazillen, H. Langer, Deutsche med. Wchnschr., March 5, 1926, lii,* 396.—*(H. S. W.)*

New Protective Inoculation against Tuberculosis.—*Saponin,* a bacillary emulsion, was given to 20 rabbits once in amounts of 0.1 mgm.; 20 rabbits given three times 0.1 mgm.; 20 once 0.5 mgm.; and 20 three times 0.5 mgm. intravenously. Sixty days after the last injection the animals were inoculated with a 4-weeks-old culture of the same strain of bacilli on glycerol-agar. In 24 the injection was given into the testes, in 24 intravenously and in 24 subcutaneously, and 8 were used as controls to determine the injury produced by the injections. The vaccinations with 0.5 mgm. in three intravenous applications proved harmless to grown rabbits. The changes, found in the lung as the result of the immunizing injections, resembled foreign-body tubercle. The animals showed decided resistance to various infecting doses, while non vaccinated controls all developed progressive tuberculosis. Even after large infecting doses, when there was a generalized tuberculosis in the immune animals, the course was not so severe as in the controls. The animals infected subcutaneously with 0.1 and 1 mgm. were completely protected. Of the 63 immune animals (9 dying of intercurrent disease), there were 19 incompletely, 19 almost completely and 25 completely immune.—*Über ein neues spezifisches Tuberkuloseschutz- und -Heilmittel. Erzeugung von Tuberkuloseschutzimmunität bei Kaninchen. IV. Mitt., R. Arima, K. Aoyama and J. Ohnawa, Ztschr. f. Tuberk., 1925, xliii, 112, 201 & 307.—(H. J. C.)*

Lung Abscess from Medical Standpoint.—The diagnosis of lung abscess presents a variable problem. The multiplicity of its causes makes it impossible to speak of a typical clinical picture early in the disease, that following bronchopneumonia, for instance, being quite different from the post-tonsillectomy case. The physical signs depend upon the location of the lesion, and therefore vary widely from obvious early signs, if the abscess be near the chest-wall, to slight or absent signs if the abscess be deep-seated. Roentgenographic examination is invaluable, not only in diagnosis but also in localization. Diagnosis by attempted aspiration is to be condemned because of the danger of infecting the pleura. The location of the abscess makes it possible to predict to a certain extent the course it will take. Thus, an abscess in an upper

lobe is more apt to have adequate natural drainage than a lower-lobe lesion. An abscess near the hilum may drain spontaneously, and is in an excellent position for bronchoscopic approach, but one close to the periphery can rarely be emptied satisfactorily by postural drainage and is difficult of access for the bronchoscopist. Here surgery usually becomes necessary. The measures included under medical treatment include: *1:* Postural drainage for ten or fifteen minute periods several times a day. *2:* Rest in bed as long as there is fever. *3:* High caloric diet. *4:* Autogenous vaccine after the acute initial stage, at times of value in border-line cases as the determining factor in the nonoperative cure of a patient. *5:* Drugs to stimulate appetite and combat secondary anemia, but none to suppress the cough. *6:* Bronchoscopic treatment, extremely valuable both in diagnosis and treatment. If the patient continues to improve, the above measures may be persisted in six to eight weeks. At the end of that time many cases that seemed sure to need surgical intervention will be well on the way to nonoperative cure. An abscess which has not cleared up at the end of three months is not very likely to do so thereafter without the aid of surgery. The importance of frequent physical examinations and roentgenograms and of coöperation between the internist and the surgeon is emphasized.—*Lung Abscess from the Medical Standpoint, R. A. Kern, Am. J. Roentgenol. & Rad. Ther., May, 1926, xv, 407.*—(*E. H. K.*)

X-Ray Diagnosis of Lung Abscess.—Roentgen-ray examination is the most important method of studying lung abscess for the following reasons: *1: Diagnosis of the Condition:* It is the most exact single method, but its accuracy depends upon a thorough knowledge of the clinical aspects of the case, and the final diagnosis should be made only after correlation of the roentgen-ray findings and the clinical data. *2: Location and Extent of the Abscess:* This must, in many instances, be the determining factor in the choice of the method of treatment. The importance of stereographic roentgenograms in the erect posture, of direct lateral views and of serial studies is emphasized. All cases are medical in the beginning, and continue so unless they show little or no improvement for a period of several weeks. Their location and extent will determine whether bronchoscopic drainage or operation is indicated. Accurate localization is, of course, necessary for surgical intervention. *3: Study of the Progress under Treatment:* Frequent roentgenograms furnish an excellent means of studying the efficiency of medical, surgical or bronchoscopic procedures and the detection of rupture into the pleural cavity. Numerous illustrative roentgenograms accompany the article.—*The Roentgen Ray Diagnosis of Lung Abscess, H. K. Pancoast, Am. J. Roentgenol. & Rad. Ther., May, 1926, xv, 410.*—(*E. H. K.*)

Treatment of Lung Abscess.—A casual perusal of medical literature of recent years shows that an unsettled state of mind exists regarding the treatment of this condition and that there is much confusion as to the indications and results of various procedures. Different cases of pulmonary suppuration differ markedly from one another. One of the most common types in recent years is that due to the inhalation of foreign material, especially frequently seen in children and probably also comprising some of the cases following tonsillectomy and other operations about the nose and throat, especially when general anesthesia is employed. These abscesses usually begin near the hilum, and are commonest in the lower lobes. They tend to discharge their contents into a bronchus quite early. Another type, frequently multiple and bilateral, follows pneumonia, especially that due to the hemolytic streptococcus. These abscesses are less often at the hilum, and are often complicated by empyema, and associated with suppuration in other organs. Another type originates in septic emboli, and constitutes a rare complication of infections in any part of the body, such as infected operative wounds, puerperal sepsis, etc. In this type multiple bilateral abscesses may occur, usually situated peripherally. Still another type is associated with lung tumor, when constitutionally it is really an infected ulceration. *Course:* Undoubtedly many small abscesses heal spontaneously and this is especially true of the streptococcic pneumonias. Many larger ones heal by ulceration into a bronchus. If, however, healing does not occur, the inflammation passes into a chronic stage, where there are single or multilocular cavities with thick, fibrotic walls. The wide zone of edema, hemorrhage and congestion which existed around the acute abscess disappears, and instead there is much atelectasis and fibrosis. In a still more chronic stage there is present a condition of diffuse dilatation and fibrosis of bronchioles and bronchi of the affected lobe. These bronchi are lined with granulation tissue, which bleeds easily and exudes much pus. Abscesses vary from microscopic size to huge bronchiectatic ones. *Complications:* Most important and distressing is

abscess of the brain, which Tuffier has reported occurring in 13 per cent of cases of pulmonary suppuration. Extension into surrounding pulmonary tissues results in a diffuse suppurative pneumonitis. Calcified concretions occasionally form a condition termed bronchiolithiasis. Specific characteristics of lung abscess are (1) ease of extension and difficulty of drainage, (2) frequent secondary invasion by putrefactive proteolytic bacteria, and (3) persistence of cavities because of rigidity of their walls. The principles of treatment comprise (1) specific therapy in so far as possible (for instance, arsphenamine in spirochetal cases), (2) adequate drainage, (3) obliteration of cavities or, more rarely, removal of diseased areas *in toto*, and (4) general suppurative measures and treatment of sources of infection (as suppurating nasal sinuses). *Drainage* naturally occurs through the bronchial tree, and this can be improved by the effective use of that posture affording the maximum drainage, several times daily. Drainage may also be facilitated by the use of the bronchoscope with suction. It should be emphasized, however, that this procedure is dangerous in unskilled hands and may lead to perforation into the mediastinum. The bronchoscope is of paramount value in removing foreign bodies in the cases of suppuration due to these. Cases of healing reported, however, after 25 to 50 weekly bronchoscopic treatments must not be too easily assumed to be due to the bronchoscopy. The chief indications for bronchoscopic drainage seem to be in hilum abscesses, whether associated or not with foreign bodies. This is the type which ordinarily carries the best prognosis. The most compelling indications for surgical drainage are location of the abscess at the periphery, and spontaneously formed empyema due to rupture into the pleural cavity. In the absence of empyema the presence of adhesions should be established before opening the abscess. The surgical drainage of a pulmonary abscess is almost never an emergency procedure, and better results are usually obtained by waiting until the lapse of two or three weeks since the first symptoms. With increasing experience with pulmonary suppuration comes increasing conservatism. Of 108 cases diagnosed by Singer and Graham as pulmonary abscess, 54 per cent were operated on, but of those seen during the last year only 40 per cent. *Obliteration of cavities* must occur before healing can be said to have occurred, and this occurs spontaneously, perhaps chiefly by pressure of the walls together, either by compensatory hypertrophy of surrounding parts, contraction of scar-tissue, or contraction of the chest. This process can be greatly aided by artificial pneumothorax, phrenic nerve avulsion or blocking, and thoracoplasty. Compression treatment is best adapted to the hilum type of abscess, and is quite dangerous in the peripheral type because it is likely to cause rupture into the pleura. The simplest and best means of compression are by artificial pneumothorax, which is especially adapted to acute and subacute cases. Very small amounts of air, not over 200 cc., are used to begin with. The other means of compression should not be used in acute cases. *Removal of the diseased tissue*, as ordinarily performed by lobectomy, carries the prohibitive mortality of 52 per cent. Cautery pneumectomy, described by Graham, is safer. There is no exposure of the pericardium or mediastinal pleura, and thus the usual cause of death after lobectomy, suppurative mediastinitis, is avoided. Hemorrhage has not proved an important occurrence. Of 34 cases of pulmonary suppuration thus treated there has been a total mortality of 20 per cent, but 4 of the 7 deaths were due to cerebral complications some time after the operation. On the other hand, 77 per cent were greatly improved or became symptom-free. The method has also been applied to certain cases of bronchiectasis. *Supportive* measures, and especially rest in bed for acute cases, are emphasized. Adequate nutrition is important and heliotherapy of some value. It must finally be recognized that pulmonary suppuration is a very serious condition which, even with the best application of our present knowledge, will probably always carry with it a mortality or failure of treatment in 15 to 20 per cent of cases. It should also be added that over 10 per cent of cases have been found associated with malignant tumor.—*The Treatment of Abscess of the Lung, E. A. Graham, Ann. Clin. Med., May, 1926, iv, 926.*—(*A. P.*)

Surgical Treatment of Lung Abscess.—The method of treatment selected for a case of acute pulmonary abscess will depend largely on its location. There are three main types of suppuration: those cases in which the lesion is about the hilum, cases at the periphery of the lung and cases of multiple abscess. Any of these conditions may become chronic and may be associated with bronchiectasis. The principles of treatment may be classified as (1) measures directed against the exciting cause, (2) the promotion or improvement of drainage, (3) collapsing of cavities, (4) the removal of chronically diseased tissue, and (5) general supportive measures, with particular reference to light therapy. Measures directed

against the exciting cause consist in the removal of foreign bodies and a direct attack on the invading microörganism so far as that is possible. In cases which are associated with spirochetosis arsphenamine is of remarkable value. Improvement, in cases of chronic pulmonary suppuration, often follows the treatment of chronic nasal suppuration. Spontaneous drainage is usually accomplished through the trachea. To obtain the maximal spontaneous drainage through the trachea it is necessary to place the patient in the most suitable position. When an abscess has ruptured spontaneously into the pleural cavity simple drainage of the empyema often results in the prompt healing of both the pulmonary abscess and the empyema. Surgical drainage of pulmonary abscess is indicated in cases in which there is a large abscess near the periphery of the lung, with little drainage through the trachea, and in which marked toxic symptoms are present. The operations should be carried out in two stages, the first stage to create adhesions and the second to produce drainage through these adhesions. Surgical drainage is only rarely indicated in those cases in which the abscess is situated at the hilum, for those are the cases in which drainage by posture and through the bronchoscope give the best results. Surgical drainage in any case should not be undertaken too early, and especially not during the formative stage of the abscess. The collapsing of cavities may be artificially aided by pneumothorax, by avulsion of the phrenic nerve to produce paralysis of the diaphragm, and by thoracoplastic operations. Methods of treatment such as these are chiefly indicated in those abscesses which are situated near the hilum, in which the collapsing of cavities in the lung will be accompanied by an increased drainage of pus into the bronchial tree. In cases in which the abscess is near the periphery of the lung any form of collapsing therapy is ill advised. It may lead to a rupture of the abscess into the pleural cavity, it may increase the spread of the infection in the lung, and it may decrease the amount of drainage into the bronchial tree. Of all the methods of compression therapy, artificial pneumothorax is the simplest and probably the safest, although even this procedure is not without danger. Its value lies not only in therapy but also in diagnosis; for by this means much information can be obtained concerning the presence of adhesions and the location of the abscess. The most distressing and serious aspects of pulmonary suppuration are the complications. They are cerebral embolism, brain abscess, hemorrhage, spread of the infection in the lungs, and abscesses elsewhere in the body. In the adult also the possibility of carcinoma of the lung, either primary or secondary, must always be considered.—*The Surgical Treatment of Pulmonary Suppuration in Children, E. A. Graham, J. Am. M. Ass., September 11, 1926, lxxxvii, 806.*—(*W. W.*)

Pathogenesis of Bronchiectasis.—The bronchiectasis of adults frequently begins in early childhood. Congenital anomalies play practically no etiological rôle. The origin is to be sought in an intrapulmonary condition, with secondary involvement of the pleura, and following upon measles, whooping-cough, influenza or other pulmonary inflammation. Surgical procedures in severe cases in adults appear to be fully justified, especially those recently described by Brauer. Interral treatment and collapse therapy are contraindicated, especially in the cases observed in children, and more so in the severe cases among adults.—*Klinische Beiträge zur Pathogenese der Bronchiektasen, K. Brünecke, Beitr. z. Klin. d. Tuberk., 1925, lxii, 621.*—(*H. J. C.*)

Treatment of Bronchiectasis.—The rational prophylaxis of this disease depends upon a knowledge of the conditions under which it develops. A process, which produces a stenosis of a part of the bronchial tree, leads to atelectasis. The accumulation of pulmonary secretions in this area may cause stretching of the bronchial wall. Inflammatory conditions involving the bronchial wall may also be responsible for bronchiectasis, as may disease processes outside the bronchus, loss of tone of the bronchial musculature, or high intrabronchial pressure from certain occupations. Congenital anomalies should also be considered as etiological factors. For the latter, prophylaxis naturally can do nothing, but one can find and treat early stages of localized pulmonary disease, residual areas of bronchitis or of bronchopneumonia, or pleurisy. The patient with pneumonia should not be allowed to return to work until he is afebrile, and one with pleurisy should have his activities restricted until signs have disappeared and pulmonary excursion is normal. Heat, cutaneous irritation and fibrolysin are some measures that tend to induce healing. The early diagnosis of bronchiectasis is very difficult, both upon physical examination and roentgenographic study. The discovery of an inflammatory process associated with much thickening of the bronchi should lead one to expect subsequently a development of bronchiectasis. The use of substances (iodipin) in the bronchi for contrast plates sometimes

aids in arriving at an early diagnosis. In a bronchiectasis there is usually an associated bronchitis that may be treated with potassium iodide, just as if it were the only condition present. If the disease reaches the putrid stage, turpentine by inhalation or creosote, and residence in a warm climate, are recommended. Breathing exercises, in which the utmost expulsion of air is accomplished with each expiration, sometimes are helpful. Atropin helps in some cases when secretion is copious, and the intracutaneous injection of 10 cc. of a 10 per cent saline solution gives good results. In the last decade the chief measures used in the treatment of bronchiectasis have been salvarsan, the "thirst cure" and posture. With proper posture that drains out the sputum, not only does the patient eliminate the sputum, but the latter is secreted less readily and the patient becomes symptomatically improved. Salvarsan has not helped the patients in whom it has had a fair trial (given at five-day intervals in doses of from 0.3 to 0.45 gm. per dose for ten injections). When fluid intake is materially reduced, there is a corresponding reduction in the amount of sputum. Rest in bed and hospital care will often produce an improvement in the condition that will last for a year or more. In a few cases pneumothorax, phrenicotomy, and especially surgery of the lung lead to amelioration or cure.—*Über Bronchiectasenbehandlung, E. Schott, Deutsche med. Wchnschr., July 23, 1926, lii, 1258.* —*(H. S. W.)*

Massive Collapse of Lung.—The clinical manifestations of this condition are of great importance, and a prompt recognition of the physical signs and symptoms is therefore of value. *Physiological Considerations:* Keith has shown that the great fissure in the lung is of fundamental importance, the upper lobe being expanded by the mechanism of the upper ribs and the lower by a compound mechanism of diaphragm and lower ribs. The extensibility of the lung varies according to three anatomical zones: (1) the root, practically nonextensible; (2) the intermediate zone, containing vascular and bronchial manifestations; and (3) the outer zone of expansile tissue. Expansion takes place by a moving apart of radiating inexpansile structures and a filling out of the intermediate and peripheral expansile areas, a mechanism likened by Keith to the opening of a Japanese fan. The upper lid of the thorax is formed by the first ribs and manubrium. It is held immobile by the scaleni, and acts as a fixed point from which the upward movement of the ribs originates. The expansion of the upper lobe is mainly brought about by the lifting of the five upper ribs, with an increase in the anteroposterior thoracic diameter. This lifting is the result of contraction of the external intercostals. The lower thorax is cylindrical rather than conical in form, and the contraction of the diaphragm is the chief factor in ventilation of the lower lobes. The diaphragm and intercostals pull in opposite directions on the lower ribs, the one tending to close the subcostal angle, the other to open it. Briscoe differentiates the contraction of the diaphragm into two parts,—the crural, dependent on stimulation through the phrenic nerves, and the costal, partly supplied from the intercostal nerves. Patients are classified by him into three types, according to the predominance of crural or costal contraction. *Causation of Pulmonary Collapse:* While William Pasteur deserves the credit for first noting and describing the phenomenon of postoperative massive collapse of the lung, the recent war led to a concentrated study of chest-wounds, and collapse came to be recognized as a frequent occurrence. It is obvious that various causes may operate, including obstruction of a main bronchus, which, however, has not commonly been found postmortem. Pasteur himself regarded the condition as due to diaphragmatic paralysis. X-ray examination of these causes invariably shows the diaphragm raised on the affected side and even moving in a reverse direction; moreover, frequently opportunity was afforded during the war of observing the diaphragm through a hole in the chest-wall, and its flaccid atonic condition was obvious. The mechanism of the paralysis is debatable, as the collapse may not be associated with injury to either lung or chest-wall, and may occur after abdominal injuries or operations. Whatever the mechanism, the result is a cessation of ventilation of the lung, with speedy absorption of residual air and atelectasis. It has recently been noted that in traumatic cases the uninjured lung may exhibit a similar condition. Finally, the well-known experience of being "winded" by a sudden blow may be due to temporary diaphragmatic paralysis. The happy conjunction of an X-ray plant and a "winded" patient may settle this point. *Varieties of Collapse and Associated Signs:* Most common is massive collapse involving an entire lower lobe; in other cases only a wedge-shaped area with its base downward is involved. Collapse may be homolateral or contralateral. Occasionally the upper lobe alone is affected. The physical signs in some respects simulate those in pneumonia, but the retracted immobile chest-wall is in striking contrast

with the increased fulness so often noted in that condition. The most definite and constant sign is displacement of the cardiac apex toward the collapsed area, sometimes very extreme in degree and occurring very rapidly. With complete collapse there is absolute dulness, suggestive of fluid, but differentiated by the position of the cardiac apex. At first, breath-sounds are absent, or there is faint respiratory whisper, as no air passes through the lung. Later the breath sounds become tubular or amphoric and vocal resonance is greatly increased. Finally dulness and tubular breathing begin to diminish, and moist adventitious sounds are often present. With reëxpansion the heart returns to its normal position. *Symptoms:* These may not be marked. Some dyspnea, more noticeable on exertion, is usually present, much more pronounced if both lungs are involved. Cyanosis is rarely marked, but a brick-red color of the face is common. A weak irritative cough is the usual feature. *Treatment:* If dyspnea is prominent, oxygen should be given in measured quantites by the Haldane apparatus. For prophylaxis after surgical operation on the upper abdomen the semi-upright position should be adopted as soon as possible. *Summary: 1:* Massive collapse is a definite clinical condition. *2:* It is caused by inhibition of diaphragmatic action, from reflex or inflammatory causes. *3:* Its onset is favored by the supine position. *4:* It follows direct trauma of the chest-wall or lung, and surgical operations on the abdomen, even remote from the diaphragm. *5:* It gives definite physical signs, which may simulate pneumonia or pleural effusion. *6:* The differential diagnosis depends on determining the position of the apex-beat and the diaphragm. *7:* It may, in cases of injury, affect the lung on the side remote from the trauma. *8:* Its occurrence, of itself not necessarily of grave import, places yet another burden on a patient already struggling with injury or disease. *9:* Treatment should be preventive.—*An Address on Massive Pulmonary Collapse, A. B. Soltan, Brit. M. J., March 21, 1925, no. 3351, 544.—(A. P.)*

Massive Collapse of Lung.—This is described as complete or partial collapse of the lung occurring after operation and injuries. It is characterized by dulness, cardiac displacement toward the dulness, and flattening and immobility of the affected side. Other signs are variable and not so characteristic. The theory of causation is discussed, and several case-reports presented with two cases of the author, one of which did not follow operation but came on in the course of a subdiaphragmatic abscess. It is estimated that of all postoperative pulmonary complications this condition occurs in at least 8 per cent and, therefore, should be guarded against by employing light anesthesia, not allowing the patient to remain in a position that restricts respiration long, and the avoidance of trauma. Active treatment is largely symptomatic, though the bronchoscope may be employed at times with benefit.—*Massive Atelectasis of the Lung as a Surgical Complication, F. L. Hunt, Boston M. & S. J., January 14, 1926, cxciv, 58.—(B. H. D.)*

Chronic Nontuberculous Infections of Lungs.—Chronic nontuberculous infections of the lungs and bronchi are far more common in early life than is generally appreciated. Chronic bronchitis may be one of the results of chronic lesions of the cardiac orifices. It may also be a complication of bronchiectasis and chronic interstitial pneumonia, and occasionally of pulmonary tuberculosis. The chief symptom of chronic bronchitis is cough. There are few physical signs. Localized cylindrical or sacculated bronchiectasis may result from a foreign body. The most common cause of bronchiectasis in childhood, however, is chronic interstitial pneumonia. Bronchiectasis should be suspected when, in the course of chronic bronchitis, the sputum is more abundant and more foul than is usually the case. Chronic bronchopneumonia practically never occurs in childhood, unless it is tuberculous in origin. The nearest approach to a chronic bronchopneumonia occurs in rachitic infants. The tactile fremitus is usually somewhat increased, and numerous moist râles of various sizes are present. Subacute bronchopneumonia, persisting for weeks and sometimes for several months, does occur in infancy. The onset in tuberculous bronchopneumonia is usually rather slower than in the nontuberculous form, and is less likely to follow bronchitis. The areas of consolidation vary from time to time in nontuberculous bronchopneumonia, clearing up in one place and developing in another; while in tuberculous bronchopneumonia an area never clears, but constantly increases in size. Sometimes after lobar pneumonia the lung does not clear up and the alveoli become organized. There is an overgrowth of connective tissue in the alveolar walls, in and about the bronchi and in the framework of the lungs. When chronic interstitial pneumonia follows lobar pneumonia the signs of consolidation persist in the lung. The temperature continues to be a little elevated after the crisis Cough and rapid respiration persist, and the child, although not acutely sick, does not get

well. Chronic interstitial pneumonia is almost always mistaken for tuberculosis. Tuberculosis, however, almost never develops after lobar pneumonia, and tuberculosis in early life is almost never unilateral. Abscess of the lung in early life is almost always due to the inhalation of a foreign body. The objects most commonly inhaled are pieces of adenoids and tonsils. An abscess may also develop as a sequel of lobar pneumonia or as the result of the breaking through of an empyema. The first symptoms in these cases are slight irregular fever and cough. Sometimes there is pain on one side of the chest. The temperature becomes characteristically septic, and the general constitutional symptoms of a purulent focus in the body develop. If the abscess connects with a bronchus there is a considerable amount of foul, purulent sputum which may be coughed up intermittently. If it does not, there is but little sputum. The physical signs depend on whether the abscess is open or closed, and whether it is near the surface of the lung or not. Moist râles are often present if the abscess is near the surface. The roentgen-ray is very useful in locating abscesses deep in the lung. The etiology and symptomatology of interlobar empyema is the same as that of other forms of metapneumonic empyema. The difference is in the physical signs which are usually most obscure. The most important point is a horizontal strip of dulness in the axilla at about the level of the fourth rib with normal resonance above and below it.—*Chronic Nonspecific Infections of the Lungs and Bronchi, J. L. Morse, J. Am. M. Ass., September 4, 1926, lxxxvii, 736.—(W. W.)*

Relation of Sinus Infection to Disease of Respiratory Tract.—Certain types of disease of the paranasal sinuses tend to produce peribronchial infections, with resultant chronic bronchitis, asthma and bronchiectasis. Experiments have been directed to identifying the lymph channels that drain the sinuses. Lymphatic absorption from the nasal sinuses was by way of the submaxillary and internal jugular nodes, the lymph ducts, the great veins, the right side of the heart and lungs. Bronchial and mediastinal lymph nodes were involved also. Clinically, the lymph nodes that seem to be important are the submaxillaries and the internal jugular, the latter corresponding to the entire chain of deep cervical nodes in man, including the retropharyngeal nodes. An infection of the paranasal sinuses may be present in any one of the following stages: acute inflammatory, acute purulent, chronic purulent, and chronic hyperplastic. Unless recovery takes place, the tendency of any of these types is to develop into the chronic purulent type. Up to this stage the disease process shows little tendency to involve the lower respiratory tract. The chronic purulent stage tends to produce great thickening and a pyogenic condition of the mucous membrane: the infection becomes attenuated and the chronic hyperplastic stage results. The process is particularly likely to begin in childhood, when acute infectious diseases and malnutrition predispose to the development of chronic involvement of the sinuses. The hyperplastic is by far the most important form of paranasal infection as a factor in the causation of chronic chest infections. Types of lung infection that may be caused by paranasal infection are (1) acute bronchitis, (2) bronchial asthma, and (3) chronic bronchitis and bronchiectasis. *1: Acute bronchitis:* This probably is merely coincident with acute upper respiratory infections, but the possibility of extension through the lymph channels should be borne in mind. *2: Bronchial asthma* may be due to secondary peribronchial infection, bacterial or pollen protein sensitization, or reflex causes, as has been explained by Sluder. *3: Chronic bronchitis and bronchiectasis:* These are considered together, since they are due to the same underlying causes. Protracted flooding of the lymph-channels with infectious material from the hyperplastic maxillary sinus tends to produce a chronic peribronchitis. Besides infections of the paranasal sinuses, the common etiological factors of chronic bronchitis and bronchiectasis are lung abscess, foreign bodies and fibroid phthisis.—*The Relations of Paranasal Sinus Infection to Disease of the Lower Respiratory Tract, W. V. Mullin, J. Am. M. Ass., September 4, 1926, lxxxvii, 739.—(W. W.)*

Bronchoscopy of Nonspecific Infections of Lungs.—Bronchoscopic and esophageal phases of chronic nonspecific infections may be considered under four heads: etiology, diagnosis, prophylaxis and treatment. *Etiology:* Many cases of chronic lung suppuration are preventable. These preventable etiological factors are stagnation of pus in acute and subacute suppuration, the overlooking of foreign bodies in the lung or in the esophagus, and the overlooking of the complications of tonsillectomy. *Diagnosis:* Bronchoscopy is sometimes required to determine the mere presence or absence of suppuration in pulmonary disease; but for the purpose of differential diagnosis between chronic bronchitis, abscess, bronchiectasis, spirochetosis, neoplasm, bronchial stenosis and other conditions, the

bronchoscope is altogether invaluable. Fourteen cases are cited as proof. Contraindications to bronchoscopy are: *1:* When, in any case of lung suppuration not due to foreign body, the pediatrician, the surgeon and the roentgenologist agree that external surgery is indicated. *2:* In case of a patient moribund from conditions other than obstruction of the air-passages. *3:* In case of pulmonary suppuration due to causes other than foreign body, and in which rupture into the pleura is imminent. *4:* Diffuse suppurative pneumonitis, with rapid breaking down of lung tissue. This is a contraindication to bronchoscopy when the condition is not due to foreign body On the contrary, when due to foreign body, immediate bronchoscopic removal of the foreign body will promptly stop the whole process and is the best means for the prophylaxis of chronic suppuration. *5:* Lack of training, organization and an adequate armamentarium is an absolute contraindication to bronchoscopy in very young children. *Conclusions:* The indications for bronchoscopy in the treatment of chronic pulmonary suppuration may be thus summarized: *1:* In chronic pulmonary abscess bronchoscopic aspiration is indicated to prevent stagnation. In all chronic cases natural drainage by cough and ciliary action is inefficient; that is why these cases have become chronic. Bronchoscopic aspiration would have been prophylactic. *2:* In cases of pulmonary abscess of other than foreign-body origin, and in which the pediatrician, the surgeon and the roentgenologist deem external drainage advisable, bronchoscopic drainage is not indicated. Sometimes, after thoracotomy, the surgeon has called on his bronchoscopic assistant to restore bronchial communication for ventilation and natural upward drainage of secretions from an isolated sealed-up area of lung, and in other cases to treat residual areas of suppuration. *3:* Many cases of chronic pulmonary suppuration in children have resulted from mistaking the asthmatoid wheeze of foreign body for bronchial asthma. *4:* In bronchiectasis, as McCrae has said, "Bronchoscopy is of value when used early; but early must be stressed. This means early diagnosis, which is very rarely done. We may be able to prevent advanced bronchiectasis by early recognition and prompt bronchoscopic treatment." *5:* In every case of pulmonary suppuration, foreign body should be excluded. It is just as important in a case of pulmonary suppuration to exclude foreign body in the esophagus as in the air-passages. These two facts should be deeply impressed on the medical student. When a foreign body is present, peroral bronchoscopic removal is the only method of treatment worthy of a moment's consideration.—*Chronic Nonspecific Infections of the Lungs, C. Jackson, J. Am. M. Ass., September 4, 1926, xxxvii, 729.*—*(W. W.)*

Phrenicectomy in Chronic Pyopneumothorax.—Resection of the phrenic nerve, usually considered indicated only as supplementary to artificial pneumothorax in the treatment of certain forms of tuberculosis, has been successfully applied in the treatment of bronchiectasis and of gangrene involving the base of the lung. An instance is reported of cure by this method of an old chronic empyema with bronchial communication.—*Pyopneumothorax chronique à poussées aigues de la base gauche traité et guéri par phrénicectomie, Thevenard, Meeting, Soc. d. Chirurgiens d. Paris, June 26, 1925, reported in Presse Méd., July 18, 1925, no. 51, 966.*—*(E. H. K.)*

Sudden Death due to Pleural Adhesions.—Autopsy, performed on a man of 71 years found dead in an elevator, showed no cause of death except costal and pericardial adhesions, which on the right surrounded the phrenic nerve. This nerve is capable of giving rise to reflex respiratory phenomena and cardiac inhibition causing sudden death. The medicolegal aspect of such adhesions is emphasized.—*Un nouveau cas de mort subite par adhérences pleurales longues, P. Parisot and Morin, communication, X^e Congrès de Médecine Légale de Langue Française, May 25–27, 1925, reported in Presse Méd., July 15, 1925, no. 56, 949.*—*(E. H. K.)*

Friedländer-Bacillus Pneumonia Resembling Pulmonary Tuberculosis.—A case of Friedländer-bacillus pneumonia extended over a period of six months. The tendency of a Friedländer infection to produce septic necrosis was present in this case. Death ensued after involvement of the urinary organs combined with a general sepsis. Clinically and pathologically, the case was interesting because its chronic course would easily lead to confusion with tuberculosis, and especially because genuine cavities could be produced by the disease.—*Fall von Friedländer-Pneumonie unter dem Bilde einer Lungentuberkulose. Terminale Affektion der Harnwege, N. Berglund, Beitr. z. Klin. d. Tuberk., 1926, lxii, 745.*—*(H. J. C.)*

Fibrothorax.—Under this name are included cases of extreme cicatrization of a unilateral tuberculous process, with a displacement of the heart and other mediastinal

organs toward the diseased side. So intended, the syndrome of fibrothorax is a distinct clinical entity. It is not a rare condition, but often escapes diagnosis. Many cases, presenting physical signs of fluid, have been tapped repeatedly without success. In one case the author punctured the heart, and blood filled the syringe. The X-ray shows some characteristic changes in these cases. There is deviation of the tracheobronchial tree. The hilum on the sound side is drawn toward the diseased lung. The intervertebral discs, normally covered by the shadow of the heart, are clear and distinct. There is a marked displacement of the heart to the right or left. Injections of lipiodol into the bronchial tree reveals a marked narrowing of the bronchus entering the diseased lung. The bronchial tree may be so distorted and twisted by excessive fibrous tissue that the oil fails to enter the finer branches. The symptoms complained of by the patient are often suggestive. He complains chiefly of intense dyspnea and cough. Expectoration is not in proportion to the cough. Some expectorate very little and others more. The general nutrition is usually good in spite of the severity of the symptoms. Occasionally there is considerable difficulty in swallowing due to the displacement of the esophagus. The prognosis of fibrothorax is good. These cases with complete fibrosis and a negative sputum are clinically cured. The patient will always be subject to circulatory disturbances due to the cardiac displacement and to the extensive diminution of the pulmonary vascular area.—*La fibrosa massima del polmone tubercolare (fibrotorace), DeBenedetti, Tubercolosi, March, 1926, xviii, 68.—(U. E. Z.)*

Pulmonary Sclerosis and Lipiodol.—Roentgenographic films were shown of patients whose bronchial tree was explored with lipiodol. Small bronchial dilatations were clearly visible, and in one syphilitic case a single thickened bronchus at the left base.—*Sclérose pulmonaire et lipiodol, Polasse and Bidolle, Meeting, Soc. Nat. d. Méd. et d. Sci. Méd. d. Lyon, June 17, 1925, reported in Presse Méd., July 11, 1925, no. 55, 938.—(A. P.)*

Cancer of Lung.—The case was that of a man 63 who had a long-standing bronchitis. The clinical picture was dominated by intense dyspnea, development of a collateral circulation and marked erythematous edema of the upper extremities. There also developed a right-sided pleural effusion which was infected with pneumococci. At necropsy there was found a tumor around the site of the right bronchus, which was entirely obliterated, infiltrating the lung and compressing the superior vena cava and great azygos vein, without metastasis. It was made up histologically of a cylindrical-cell epithelioma, with here and there islands suggesting a basal-cell epithelioma.—*Sur un cas de cancer pulmonaire, G. Caussade, J. Surmont and J. Lacapère, Meeting, Soc. Méd. d. Hôp. d. Paris, July 17, 1925, reported in Presse Méd., July 22, 1925, no. 58, 984.—(A. P.)*

Cancer of Lung in Sheep.—An aged ram died suddenly, and at autopsy was found to have a large tumor involving the entire hilum-region of all lobes on the right side and numerous small metastases in other portions of the organs, besides pneumonia. Grossly, the tumor consisted of numerous large, deeply seated masses of pale yellowish-gray color and very firm consistence. Histologically, the tumor was composed of follicular structures lined by cuboidal epithelium, at some places in a single layer, at others several layers deep, and was diagnosed as an indurating adenocarcinoma.—*Pulmonary Cancer in a Sheep, A Savage, J. Am. Vet. Med. Assn., April, 1926, lxix (new series, xxii), 86.—(H. S. W.)*

Sarcoma of Lung.—In a woman, aged 47, the onset was insidious, with malaise and dyspnea on exertion. There were also acute attacks of dyspnea. A right-sided pleural effusion yielded 16 ounces of clear fluid, blood-stained towards the end of the aspiration. This did not relieve the dyspnea. A diagnosis of tuberculous pneumothorax was made. The effusion reaccumulated, and at a second tapping 12 ounces of blood-stained fluid were drawn off. Later painful nodules appeared on the skin over the anterior surface of the right chest. A biopsy examination of one of these showed it to be a sarcoma. Five months after the onset of symptoms the patient had a large hemoptysis and died.—*A Case of Sarcoma of the Lung, R. A Bennett, Brit. M. J., October 9, 1926, no. 3431, 637.—(B. T. McM.)*

Sporotrichosis and Tuberculosis.—The association of the mycoses and sporotrichoses raises many interesting problems, diagnostic, therapeutic, and etiological. A case is reported in detail in which there was an undeniable tuberculous background, giving to the sporotrichotic dermal lesions a scrofulous aspect and a papulonecrotic form not hitherto described. The man was 33 years old, and presented himself at the

dermatovenereal clinic at Val-de-Grace because of multiple subcutaneous nodules, the oldest of which had ulcerated, and in a profoundly emaciated and debilitated condition. There was a family history of tuberculosis and a suggestive past history of pulmonary congestion. Physical examination of the chest showed some abnormal apical signs and the X-ray showed, in addition to diffuseness of the hilar shadows, a stippling in certain areas with, on the left, some small nodules; there was also a clouding at the right apex. The patient did not show bacillary sputum. The subcutaneous nodules were widespread and of rapid growth, and the adjacent skin had a violaceous hue. There was a tendency to ulceration. Microscopically, the lesions presented leucocytic infiltration, and an excised fragment showed stratified squamous epithelium on a connective-tissue basis, in the midst of which were typical tuberculous nodules with numerous giant cells. After a preliminary course of autogenous staphylococcus vaccine, without benefit, potassium iodide was given, which soon resulted in symptoms of intolerance. The lesions eventually developed in a way strongly suggestive of papulonecrotic tuberculides. Meanwhile a painful arthritis of an acromioclavicular joint appeared and later the smaller articulation became involved, strongly suggesting a "tuberculous rheumatism." Vandremer's antituberculosis vaccine was given without benefit. Finally, from one of the lesions a pure culture of *Sporotrichum Beurmanni* was obtained, and an autogenous vaccine prepared and administered, with at first encouraging improvement, but later a relapse, with again articular and periarticular involvement. Smaller doses of potassium iodide were then resumed. *Summary and Conclusions:* The presence of sporotrichosis was proved by culture. Tuberculosis might be considered presumptive from the clinical picture and radiographic findings. The latter condition seemed to modify or influence the manifestations of the former. It may be said that tuberculosis favors the development of the mycoses.—*Sporotrichose et tuberculose associées "scrofulo derme" sporotrichosique et sporotrichoses "papulonécrotiques, Gougerot and Jansion, Rev. d. l. Tuberc., October, 1925, v, 579.*—(*A. P.*)

Spirochetes in Tuberculous Hemoptysis.—These observations include 46 cases of tuberculous hemoptyses, 43 of which showed the same type of spirochete. It was never found in nonsanguineous tuberculous sputum nor in nontuberculous sanguineous sputum. In these cases there were always 7 to 8 microörganisms per field. Morphological characteristics and movements differ from those of the bronchial and buccal spirochetes. Knowing the important rôle played by spirochetes in other hemorrhagic diseases one is led to believe that this microörganism is of clinical significance in hemoptoic cases.—*Présence d'un spirochète dans les crachats hémoptioques des tuberculeux, F. Bezançon and E. Etchegouin, Presse Méd., August 19, 1925, no. 66, 1111.*—(*A. P.*)

Esophageobronchial Fistula Due to Actinomycosis.—A woman of 37 years, twenty-eight years previously had had a swelling without ulceration on the right tibia, that disappeared after several months of local applications of iodine. A little later a cervical adenitis and ulceration of both corneae developed. Later there appeared a swelling over the left tibia, and aphonia (for a year) which was followed by impairment of phonation; still later, abdominal distress, severe hematemesis, dysphagia, and strangling upon swallowing food. At 19 she had pain in the left chest, and a rib-resection revealed a purulent effusion; the wound reopened and a sinus developed. No tubercle bacilli could be found upon repeated examinations, but actinomyces were disclosed. Roentgenoscopy showed an esophagobronchial fistula and the stomach normal. Upon large doses of potassium iodide marked improvement in the general condition occurred, and the patient was discharged.—*Esophagobronchial Fistula Resulting from Actinomycosis: Report of a Case, P. V. Vinson and C. G. Sutherland, Radiology, January, 1926, vi, 63.*—(*H. S. W.*)

Thyroid Disease and Tuberculosis.—The early pathologists included enlargements of the thyroid gland among the strumous swellings, and tubercle was not at first distinguished as an entity. Tuberculosis of the thyroid gland is rare, and most phthisiologists are agreed that after puberty tuberculosis of other organs exists only in conjunction with involvement of the lung or postdating it. Pathologists are agreed that in the thyroid tuberculosis exists practically only as part of an acute miliary process or as a result of extension from nearby structures, such as the cervical spine. At first sight there would seem to be little similarity between tuberculosis and hyperthyroidism, but Musser has seen and has the records of 6 patients with pulmonary tuberculosis, who at first were thought to have thyroid disease, and operation had been advised for several. Many internists have

also told of their difficulties in differentiating the two conditions, and Pettit mentions 3 patients in his sanatorium of 45 who bore cervical scars of thyroid operations. The error of calling early pulmonary tuberculosis thyroid disease seems more frequent than its converse. *Symptoms of tuberculosis and Hyperthyroidism:* The subjective symptoms, such as loss of weight, fatiguability, lassitude, debility, lack of energy, sense of weariness, nervousness and abnormal psychic states are common to both diseases. Anorexia, however, which is common in tuberculoisis, is rare in hyperthyroidism. Fever may be present in acute cases of exophthalmic goitre. Tumultuous cardiac action is the rule in Graves disease, and is rarely seen to so marked a degree in tuberculosis. *Special Methods of Differentiation:* Physical examination of the chest, when the signs are definite, reveals the presence of tuberculosis. The *blood count* shows little of significance. Both conditions usually have a mild secondary anemia and a relative or actual lymphocytosis. High *blood sugar* figures cannot be relied on as diagnostic of hyperthyroidism. McBrayer even discounts the value of *basal metabolic-rate determinations*, finding an increase in 59 per cent of 54 tuberculosis patients, and in 61 per cent of 23 incipient cases. McCann and Barr, however, found this increase in tuberculosis to be in very direct ratio to the rise in body temperature. A high basal metabolic rate does not necessarily indicate fever nor does it produce fever, but the presence of fever always increases the rate, approximately by 7.2 per cent per degree of Fahrenheit above normal (Dubois). Early toxic cases of tuberculosis may show an increase even without fever. It must be recalled that the basal metabolic estimation is not altogether simple and easy, and that the average, portable apparatus is particularly undependable; also, that several readings should be taken and checked with normal controls. A low *blood pressure* is prevalent in most cases of tuberculosis, which is not the case in thyroid disease. *Fever* is far more indicative of tuberculosis, but may be missed unless frequent afternoon and evening temperature readings are taken. The *tuberculin tests* are of definite value, especially when negative. *Compliment fixation* is considered valuable by some few. The *pharmacodynamic reactions*, such as the adrenalin reaction, are too irregular to be called specific. *Comment:* There is very much less danger in treating a case as tuberculosis until proved otherwise, than in holding it to be exophthalmic goitre until otherwise proved, for some of the methods of treatment of exophthalmic goitre are distinctly contraindicated in tuberculosis. The fundamental principle of rest is, of course, common to the therapy of both.—*Exophthalmic Goiter and Tuberculosis, J. H. Musser, Ann. Clin. Med., February, 1926, iv, 620.*—*(A. P.)*

Hyperthyroidism and Pulmonary Tuberculosis.—It is not rare to see tuberculous Basedovians; it is still more frequent to find Basedovians wrongly regarded as tuberculous. The practical interest in this question lies in differential diagnosis between the two conditions; the academic interest in the study of their relations and causal factors. *1: Differential Diagnosis between Hyperthyroidism and Pulmonary Tuberculosis:* Basedow's disease quite often simulates tuberculosis. This has been remarked by Rist, Sergent, Wunschendorff and others. It should be thought of especially in women near puberty and the menopause. Also, especially during and after the war, similar conditions were noted to develop in men following anguish, violent emotion, and projectile wounds of the mediastinum. Some of the functional and general symptoms were quite suggestive of tuberculosis. The question of differentiation concerns primarily incipient tuberculosis, when the physical signs in the chest may be indefinite or inconclusive. When the evidences of Basedow's syndrome are conclusive the chief problem is to determine the presence or absence of tuberculosis, which may coexist. Mild cases or *formes frustes* of thyroid disease are not so easy to determine, but should be especially sought at the two extremes of sexual life in women. *General Functional Disturbances: 1: Thermic instability.* In thyroid conditions the temperature is apt to be more than normally elevated, but does not show the oscillations characteristic of tuberculosis. Thyroid secretion is a powerful stimulant of the vegetative nerve centres. Walking, just as in tuberculosis, provokes rises in temperature. *2: Irritability of the pulse:* Tachycardia is one of the cardinal signs or symptoms of Basedow's disease, and is frequently accompanied by palpitation and a sense of anxiety, related to an abnormal excitability of the cardiovascular nervous system. *3: Arterial tension:* Hypotension is the rule in tuberculosis, while there is generally a slight hypertension in hyperthyroidism, but neither is invariable. *4: Menstrual disturbances:* These are common to both disorders. *5: Vasomotor and secretory disturbances:* The flashes of heat, sudden flushes and profuse sweats are also found in both conditions. *Disorders in*

general condition: The early wasting, the fatigue progressing to asthenia, the gastrointestinal symptoms, such as irregular and capricious appetite, diarrhea and abdominal pains, occur in both. The basal metabolism is constantly and strongly increased in hyperthyroid states; according to Cordier, it may also be so in tuberculosis, while, on the other hand, it may be lowered. *Localizing Functional Symptoms:* Cough occurs very frequently in thyroid disease, but its character is usually dry, short and nervous, or jerky. A dyspnea of toxic origin is frequent in early tuberculosis and almost the rule in thyroid disease, being associated with a broken, spasmodic respiratory rhythm. Senton and Schulman have shown a constantly reduced vital capacity in Basedow's disease, associated with tachycardia and reduced voluntary apnea. Thyroid hypertrophy is of course an excellent sign of thyroid disorder, and may be definitely increased under the influence of emotion, fatigue and pregnancy. Abnormal prominence or brilliance of the eyes may also be noted. Tremor is usually present, but may be very fine, vibratory in character, increased by fatigue and emotion, involving especially the upper extremities. In America basal-metabolism determinations are regarded in this field as almost on a par with the Wassermann reaction in specificity. Some reservation in interpretation is, however, necessary. Hyperthyroidism being established, pulmonary tuberculosis must be determined or ruled out, with the aid of careful stethoscopic examination, controlled by roentgenograms and sputum examinations. The combination of frank Basedow's disease with pulmonary tuberculosis is unusual, but a more or less mild hyperthyroidism is not an infrequent concomitant of the latter. Sabourin has described: *1: An angioneurotic type:* The habitus is peculiar. The eyes are large, brilliant and humid. The neck is increased in volume and the thyroid is more or less markedly hypertrophied. Circulatory disturbances consist of abnormal heart action and a congestive state of the skin and mucous membranes; there may be erythroderma or glove-like cyanosis of the hands. Palpitation is common. Nervous disturbances consist of extreme emotivity, sometimes a permanent state of anguish or anxiety, with constant agitation and excessive volubility. *2: Phthisiocardiac type:* This is characterized by an hemoptoic tendency. Other forms of hemorrhagic tendency also occur. These patients are harmed by superalimentation and tonic medication; also by altitudes. They require, first, complete rest; later, slow and progressive readaptation to community life. Some restriction of the diet may be necessary for a prolonged period; also sedative medication and glandular therapy (ovarian extract). Stimulation of skin function by the douche, tubs and friction is valuable. *Academic considerations:* The relation of cause and effect in these patients is a problem of interest. Evidence is given which might seem to favor the notion that tuberculosis induces hyperthyroidism, but it is not very conclusive. The reverse possibility is also considered. It is emphasized that hyperthyroidism and Basedow's disease are not identical, as is commonly believed. *Conclusions:* Hyperthyroidism, when mild, may simulate early tuberculosis, especially in women at the two extremes of sexual life. Tuberculosis, while rarely associated with frank goitre or myxedema, is frequent in "physiological" hyperthyroid states. Thyroid-gland therapy has a bad effect on pulmonary tuberculosis, while ovarian therapy benefits the hyperthyroid symptoms. In a few cases irradiation of the thyroid gland is indicated. Twelve case reports are included.—*Hyperthyroidie et tuberculose pulmonaires, E. Sergent and R. Mignot, Rev. d. l. Tuberc., October, 1925, v, 561.—(A. P.)*

Lymphogranulomatosis.—It has been assumed by many that the lymphogranulomatoses are either caused by tuberculosis or are intimately associated with infection with the tubercle bacillus, this contention having been strongly supported by Sternberg, among others. It is probable that a structure quite like the early fungoid state may in certain instances be established by a very few tubercle bacilli or by tubercle bacilli of weakened virulence. But there is no evidence that the tubercle bacillus is the etiological factor behind these affections. Indeed, several bits of circumstantial evidence tend to point the other way. The disease is more fulminating and the course more rapid than that of well recognized types of tuberculosis of the lymphatic system. Histologically, the tissues frequently resemble blastomycosis. The growth is many times simply that of a hyperplasia.—*Lymphogranulomatose Tuberkulose und Geschwulstreiz, H. Stahr, Deutsche med. Wchnschr., September 18, 1925, li, 1555.—(H. S. W.)*

Lymphogranulomatosis.—Lymphogranulomatosis is unquestionably an infectious disease. Two forms are differentiated, one resembling pseudoleukemia with tuberculosis of the lymphatic apparatus, and the

other, not definitely tuberculous, occasioned by the weakened toxin of various infectious diseases. Clinically, there is an acute form terminating in one to two months, and a chronic form (Hodgkin's disease). Between 1914 and 1924, 217 cases of mediastinal tumor were seen, and, of these, 43 were diagnosed as lymphogranulomatosis. The differential diagnosis of tuberculosis, granulomatosis, lymphatic leukemia and lymphosarcomatosis is possible roentgenologically only to a certain degree. Pulmonary metastases are rare. There is frequently a concomitant tuberculosis.—*Über Lymphogranulomatose, A. Wierig, Beitr. z. Klin. d. Tuberk., 1925, lxi, 567.*—(*H. J. C.*)

Key to Abstractors

A. P.: Andrew Peters, Loomis, N. Y.
B. H. D.: Bruce H. Douglas, Loomis, N. Y.
B. T. McM.: B. T. McMahon, Northville, Mich.
D. H. S.: D. H. Saley, Northville, Mich.
E. R. L.: Esmond R. Long, Chicago, Ill.
E. H. K.: E. H. Kerper, Loomis, N. Y.
F. M.: Francis Murray, Loomis, N. Y.
H. J. C.: H. J. Corper, Denver, Col.
H. S. W.: H. S. Willis, Baltimore, Md.
U. E. Z.: U. E. Zambarano, Northville, Mich.
W. I. W.: Walter I. Werner, Northville, Mich.

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